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(54) Vertical extension collapsible bearing structure, particularly for platforms and floor boarding

(57) A collapsible bearing structure with vertical extension, particularly for platforms and floor boarding, comprising pairs of tubular elements (4) that intersect at mutual hinging points (7) inside vertical planes perpendicular to each other and have their ends hinged in respective cavities (5) located in one larger face of respective articulation joints (2). Each one of said articulation joints (2) is provided with a central through hole (6) perpendicular to said larger face, in which an end of a respective vertical telescopic abutting elements (3) is set.

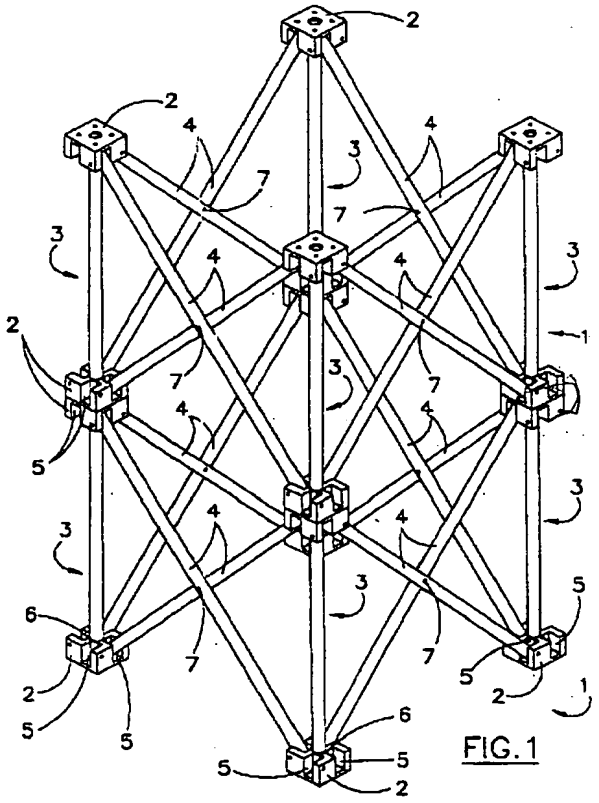

FIG.1

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Description

The present industrial invention concerns a collapsibl bearing structur with vertical extension, particularly for platforms and floor boarding.

Articulated folding structures made of pairs of crossing tubular elements hinged to each other at the point of intersection and with their ends hinged in turn in articulation joints are already known.

Such articulation joints comprise a square shape block that on one of its larger faces shows four cavities, open towards respective side walls of the block, destined to the housing and hinging of respective tubular elements, in such a way as to enable the articulated coupling of four tubular elements developing on planes orthogonal to each other.

In addition, these joints can have a through hole perpendicular to the face provided with the aforementioned cavities, which can be used for the coupling with a further tubular element.

The pairs of tubular elements, articulating in the structure, define planes respectively perpendicular and parallel to the floor and bearing plates are laid and fixed on the latter, maintaining the structure in the desired position.

An inconvenience of these structures realised by composition of these tubular elements and articulation joints is linked to the fact that they do not consent their use as to support consistent loads in a stable manner, in particular those which have to bear platforms, floor boarding or similar.

Object of the present invention is to realise a vertical extension bearing structure that would allow to support even considerable loads and that would also be collapsible parallel to the floor for its folding to conditions of minimum volume.

An additional object is to enable the overlaying and fixing of several similar structures for the formation of modular composite structures.

According to the invention, such objects have been attained with a vertical extension collapsible structure, particularly for platforms and floor boarding, comprising pairs of tubular elements that intersect at mutual hinging points inside vertical planes perpendicular to each other and have their ends hinged in respective cavities present on a larger face of respective articulation joints, each one of said articulation joints being provided with a central through hole perpendicular to said larger face, characterised in that it also comprises vertical telescopic elements with ends positioned as abutting in said central holes of respective articulation joints.

In particular, when the structure is completely open, the telescopic elements assume a minimum fixed length, and they set themselves in a stable way between each pair of articulation joints located on the same vertical, thus guaranteeing the solidity of the structur .

During the closing stage the collapsibility of the structure is possible, since the telescopic elements adjust their length to the increased distance between the articulation joints to which they are coupled, thus allowing the lateral folding of the structure.

Two structures thus formed can be overlaid modularly in order to vary the height of the global structure.

Preferably, each telescopic element comprises two tubular elements having different diameters, slidingly engaged with each other, at least one of which is provided with fixing means.

The consequent fixing of a complex structure is obtained by coupling respective telescopic elements belonging to two different structures.

A structure thus obtained is suitable for innumerable uses, in particular for the realisation of foldable bearing structures.

One of the possible uses is illustrated as a non limiting example in the enclosed drawings, where:

Figure 1 is a perspective view of a vertical extension collapsible bearing structure according to the invention in a completely open position;
Figure 2 is a view in axial section of a pair of articulation joints and of two vertical telescopic elements coupled and fixed to each other though the same joints;
Figure 3 is a partially sectioned top view of an articulation joint of the structure according to the invention;
Figure 4 is a lateral view of said structure in a completely open position;
Figure 5 is a perspective view of said structure in a position of minimum volume;

With reference to these figures, a bearing structure indicated by 1 comprises pairs of tubular elements 4 that intersect at points 7 of mutual hinging inside vertical planes perpendicular to each other and have their ends hinged in respective cavities 5 located in respective articulation joints 2.

These articulation joints 2 are in fact blocks of substantially square shape and in one larger face they have four cavities 5 suitable to house the tubular elements 4.

These tubular elements 4 are hinged to said cavities 5 by means of pins 8 that are inserted in the cavities 5 by means of through holes located on the lateral walls of the cavities 5.

As Figures 2, 3 show, the articulation joints 2 are also provided with a central through hole 6 perpendicular to the two larger faces of the joint 2. The presence of this hole 6 makes possible the introduction of one end of a telescopic element 3, that sets itself perpendicular to the face of said joint 2.

In addition, the through hole 6 is provided with a narrowing (11) on the inside, which is suitable to form limit stop abutment for the end of the telescopic element 3 inserted into the same hole.

In particular each telescopic element 3 is formed by two tubular elements 3a and 3b, which can slide one

inside the other.

When the structure is completely open, the distance between pairs of joints 2 located on the same vertical is determined by the presence of the telescopic elements 3. Indeed, in an operating condition the internal tubular element 3a is completely inserted into the external tubular element 3b and therefore the latter positions itself in a stable way between two articulation joints 2 of the structure 1.

When the structure 1 is operating, planes parallel to the floor on which bearing landings are placed are thus identified, and the telescopic elements 3 constitute their uprights.

Structures 1 realised in this way are modularly assemblable in order to obtain a global structure, as illustrated in Figures 1 and 4 that comprises two overlaid structures 1. The fixing of the global structure thus obtained is done by coupling of the external tubular elements 3b through respective pairs of articulation joints 2 as it is evidenced in Figure 2.

Said coupling is obtained by means of fixing means 9,10, which said telescopic elements 3b are provided with. In particular said fixing means can be screw means, respectively male and female, that engage with each other inside the holes 6 of the articulation joints 2.

The presence of the telescopic elements 3, realised through the tubular elements 3a and 3b that are constrained to respective articulation joints 3, but that can slide one inside the other, enables the lateral collapsibility of the structure, as it is evident in Figure 5. In fact, during the operations of the closing of the structure 1 the distance between each pair of joints that are on the same perpendicular increases and the tubular elements 3a, 3b, that are respectively fixed to each element of said pair of joints 2, slide one on top of the other, following the closing movement.

The structure according to the invention is therefore utilisable to bear consistent loads, but it involves a minimum volume when closed.

Claims

1. Collapsible bearing structure with vertical extension, particularly for platforms and floor boarding, comprising pairs of tubular elements (4) that intersect at mutual hinging points (7) inside vertical planes perpendicular to each other and having their ends hinged in respective cavities (5) located in one larger face of respective articulation joints (2), each one of said articulation joints (2) being provided with a central through hole (6) perpendicular to said larger face, characterised in that it also comprises vertical telescopic elements (3) with ends set abutting in said central holes (6).

2. Structure according to claim 1, characterised in that said t lescopic elements (3) are provided with mutual fixing means (9, 10) engageable with each other inside said central holes (6) of the articulation joints (2).

3. Structure according to claim 2, characterised in that said fixing elements (9; 10) are screw means.

4. Structure according to any one of the previous claims, characterised in that said through hole (6) is provided with means (11) suitable to form a limit stop abutment for the end of the telescopic element (6) within the hole itself.

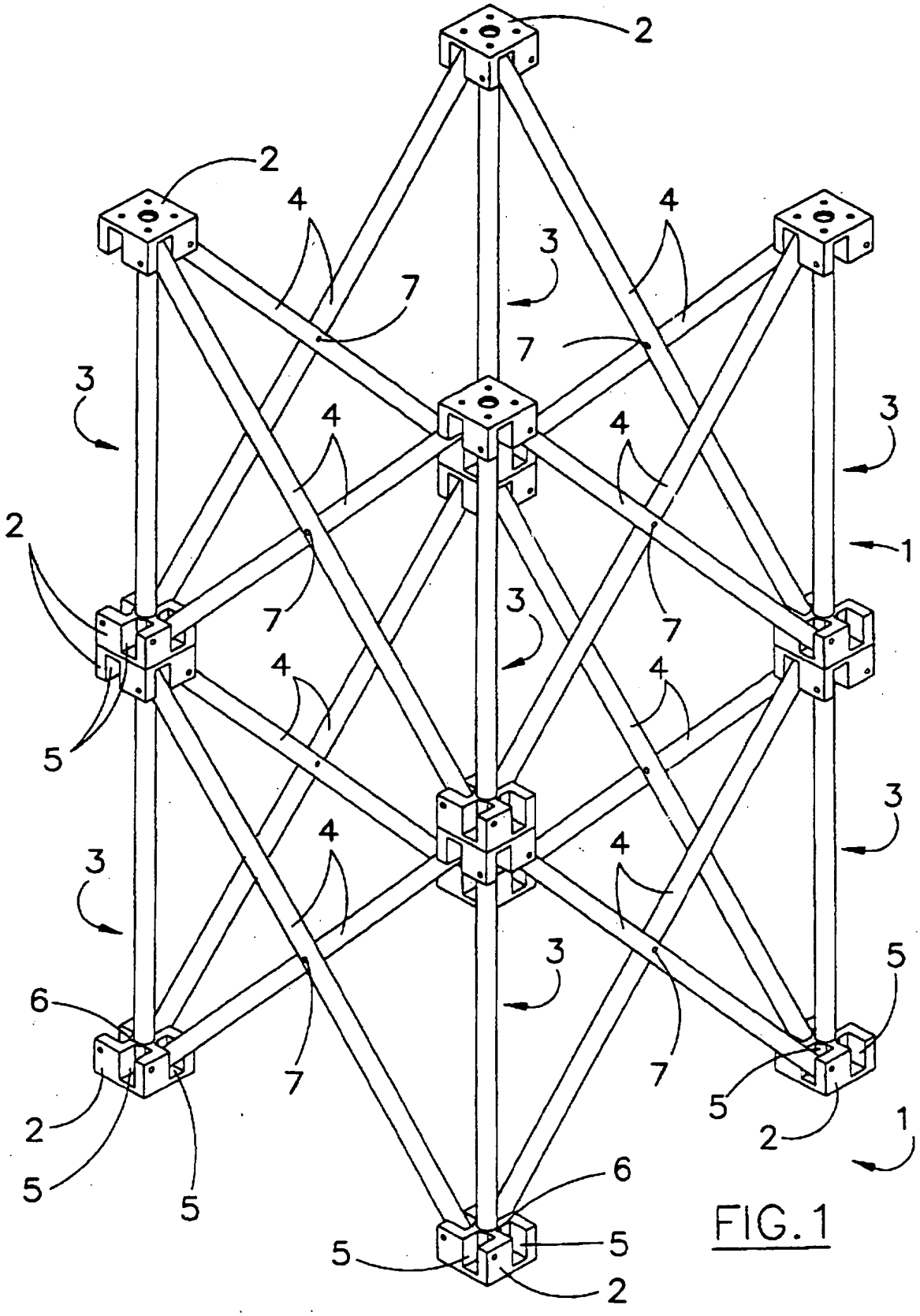


FIG.1

FIG.2

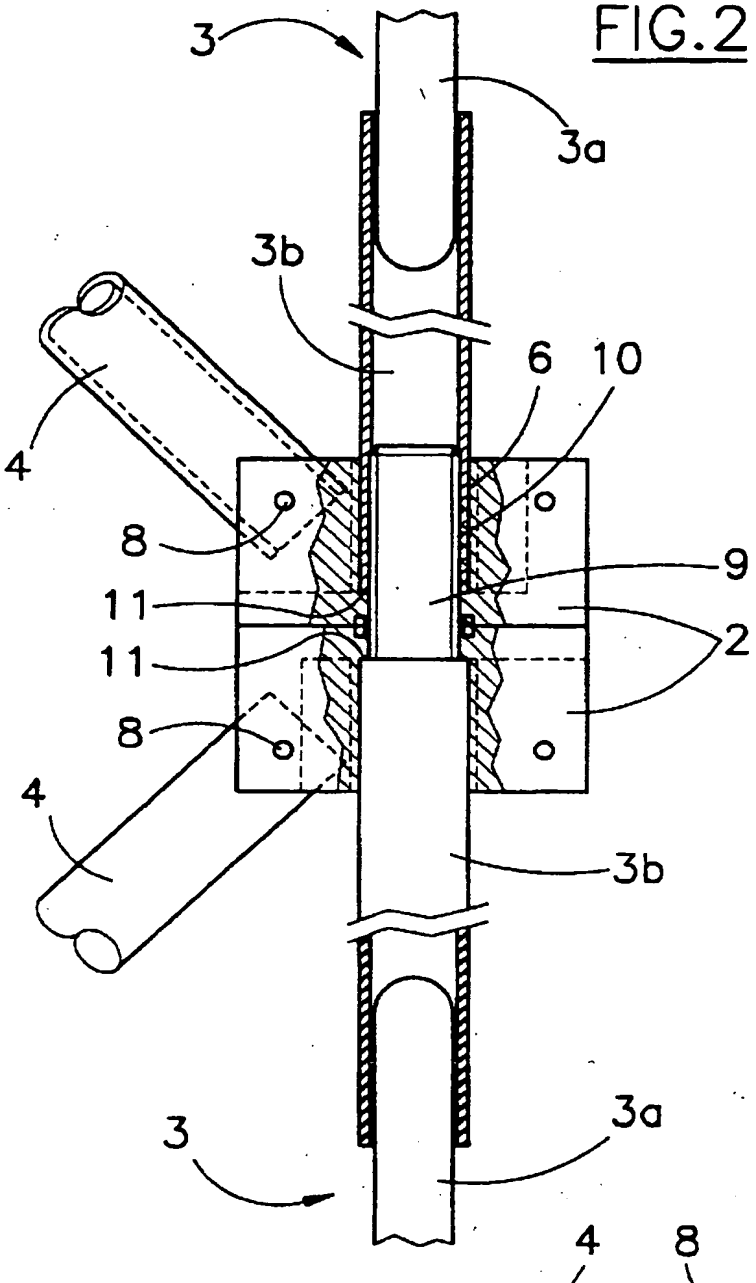
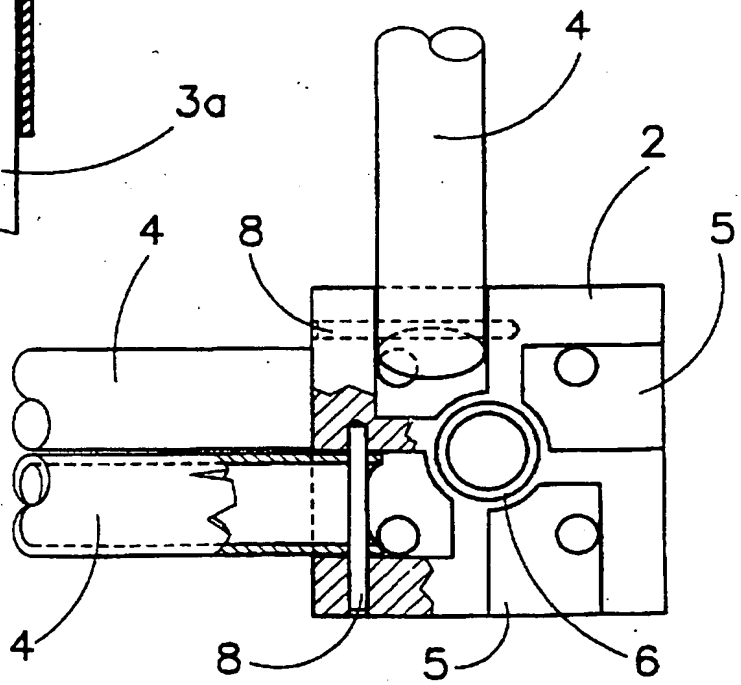


FIG.3



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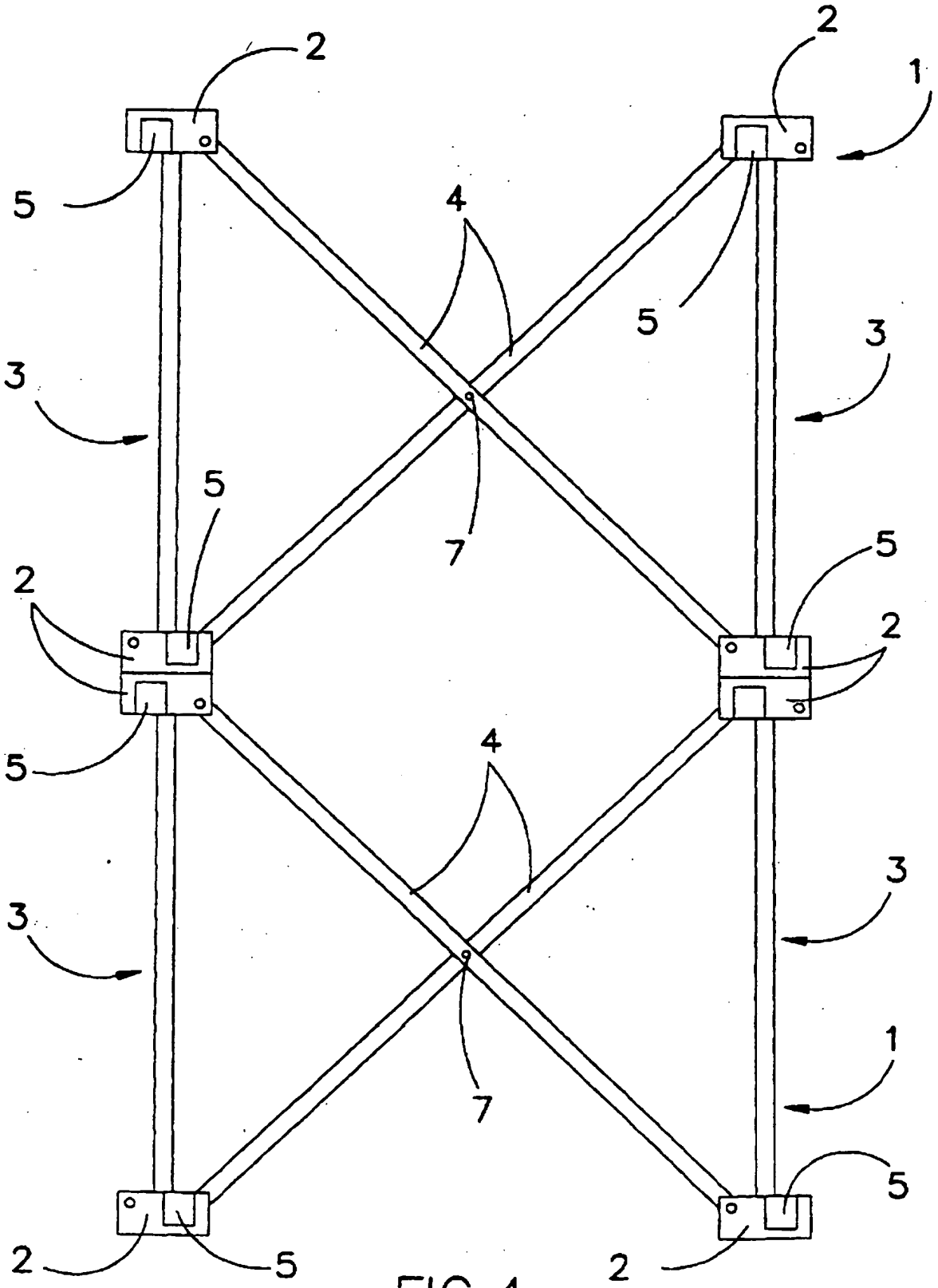

FIG.4

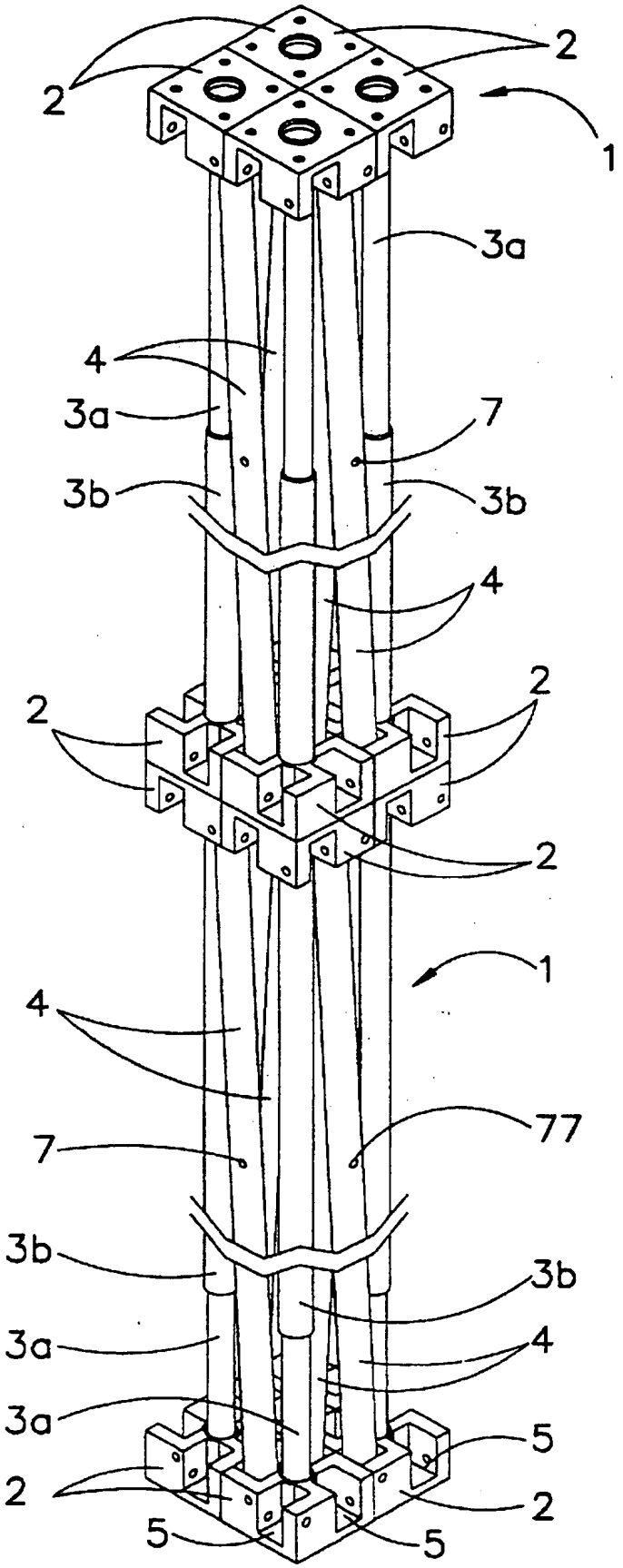

FIG.5

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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 1920

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	CA 2 114 767 A (G. BRAGHIERI) 3 August 1995 * page 4, line 20 - page 5, line 22; figures *	1,2	E04B1/344 E04H3/28 E04H12/18
Y	US 3 011 586 A (J. HARVEY) 5 December 1961 * column 2, line 8 - line 13; figures 1,2,5,8,9 *	1,2	
A	FR 1 151 764 A (ATAG-TRUST) 5 February 1958 * figures 3-5 *	3	
A	WO 96 33326 A (T. ZEIGLER) 24 October 1996		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
E04B
E04H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 September 1998	Kriekoukis, S

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